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## Upper Arctic Ocean Properties and Relationships with Sea Ice in CMIP6 Historical Simulations

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While current-generation CMIP and OMIP models have clear biases in their upper Arctic Ocean hydrography, it is less clear how these biases impact the models' ability to simulate the observed Arctic sea ice mean state and trends. In this study we seek to quantify cross-relationship between sea ice and ocean states in CMIP6 historical simulations and identify common model behaviors. Multi-model mean (MMM) simulations exhibit accelerated changes in the ice and ocean system since the late 20th century. Underlying the MMM is strong inter-model variation in the simulated ice and ocean mean states and their temporal variability including trends. Despite such inter-model differences, all models show a similar ratio between sea ice reduction and upper ocean warming such that models with higher ocean warming also have higher SIE reduction and vice versa. Our results also highlight the urgent needs of reliable Arctic Ocean observations or data products in order to better contextualize modeling results.